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MAPPING AND SURVEY SERVICES
IN THE GERMAN ARMY (1920 - 45)

by

Graf von Klinckowstroem

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Biographical Sketch of the Author

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Place of Birth: Quedlinburg, Harz

Immediately after graduating from high school in 1924, von KLINCKOWSTROEM joined the army, entering the 29th Cavalry Regiment as an officer candidate. Following two years of training at the Ohrdruf Infantry School and the Hannover Cavalry School, he was commissioned as a second lieutenant in December 1927. In April 1929, he was awarded General Staff Corps status after the customary training, which included courses at the Kriegsakademie in Berlin.

When World War II broke out, von KLINCKOWSTROEM, then a captain, was serving an assignment as operations officer on the staff of the 227th Infantry Division. With this division he took part in the 1940 campaign in Holland, Belgium, and France, and remained in France until the end of that year. He was then transferred to Italy to direct transportation to Africa and for assignment as transportation officer -- later as operations officer -- on the staff of the Commander in Chief, South. In April 1943 while serving in the latter assignment, he was promoted to colonel. During the further course of the war, he served in assignments as chief of staff at corps level in Italy and as deputy chief of the Mapping and Survey Branch of the Army General Staff. In late April, 1945, he was placed in the officer reserve and transferred to Traunstein, Bavaria. On 8 May 1945, he was taken prisoner by US forces at Marquardstein, Bavaria.

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Chapter 1

Mapping and Survey in the German Army Before World War II

After World War I the Prussian and Saxon geodetic survey, which with their triangulation nets and map series covered the major part of Germany and were assigned to their respective general staffs, were separated by the conditions of the peace treaty from the *Reichswehr*,[*] which remained an agency of the Reich, and were transferred to the domain of the ministries of the interior. The Reich Survey Office (*Reichsamt fuer Landesaufnahme*) was then founded by merging the Prussian and Saxon survey agencies. Although they had declared themselves ready to do so, the South German states did not join the Reich Survey Office, which, therefore, was no more than a torso. Except for minor projects on artillery ranges and troop training grounds the *Reichswehr* did not carry on any mapping and survey activity of its own.

The German cartographic service had gradually become very outmoded because of the retrenchment following the economic slump. With the exception of a few maps covering areas of special economic importance, nearly all the map series were completely obsolete. Besides, the mapping and survey services within the German Reich were confused and heterogeneous. Each state had retained its own systems, based on its own projections and base lines, as well as its own conventional signs. Along the borders of the various map series there were gaps and inconsistencies. In one South German troop training area the maps of three different states overlapped. Map fire, therefore, from one corner of this area into another was impossible.

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[*] Tr: The German National Defense Establishment under the Versailles Treaty.

After the declaration of military sovereignty in 1935 it was imperative for the Wehrmacht (Armed Forces) to have control of the mapping and survey services in the interest of defense. At first, the German Armed Forces and Army High Commands had to create an agency which would look after the interests of the Wehrmacht in this respect and take care of their requests to the civilian offices. For this purpose the Geodetic Section, up to that time an appendage of Branch One (Operations) of the Army General Staff, was made a regular branch (Nine) of the General Staff and was designated as the Mapping and Survey Branch (Abteilung fuer Vermessungs- und Kartenwesen). Lieutenant Colonel Hemmerich, GSC, who had been a member of the Triangulation Section of the Prussian General Staff before the war, was appointed chief. Because of his experience and his friendly relations with civilian experts he succeeded, in spite of many obstacles, in making the department into an efficient instrument and in securing attention to the requests of the Wehrmacht.

I. Standardization of the German Mapping and Survey Services

As a first step, it was necessary to standardize the survey systems and maps of the different states. The most radical and simple solution of this problem would have been to assign the state survey agencies, apart from the cadaster, to the Wehrmacht. A proposal to this effect from Branch Nine was turned down by the then Minister of Defense and Commander in Chief of the Wehrmacht, Field Marshal von Blomberg, who was quoted as saying: "Now don't you bother Interior Minister Frick! He has already lost nearly all his authority in the labor field and now you want to take Survey away from him! However, I need him for other more important matters." Therefore, the attempt was made to effect the standardization of German mapping and survey in another way. Branch Nine then recommended standardization along civilian lines. Full supervisory responsibility, however, was to be retained by the branch. The recommendation was sanctioned by all concerned and was quickly and efficiently carried out by the Ministry of the Interior. Along the same lines as the Wehrkreis* organization, Germany was divided up into areas, each controlled by a "Main Survey Office," (Hauptvermessungsabteilung) which was an agency of the civilian administration. The Ministry of the Interior was to issue uniform instructions to these Main Survey Offices and give due consideration to military requests. The Survey Offices were to publish joint geodetic data and conventional signs for cartographic use. Based on these publications the Main Survey Offices were to standardize surveying and mapping procedures in their respective areas. Close liaison with the cadaster made possible utilization of its data by the higher-level survey and mapping services.

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*Tr: Military Districts somewhat similar to former US Army corps areas

In the course of this standardization and concentration of the entire German survey system it was necessary to carry out the intended principal triangulation in the South German states quickly so that the entire German network could be co-ordinated in a uniform manner. The results of this new first-order network served as a basis for the surveys in the various states.

Since extensive new surveys also had to be carried out in the lower order, the work was divided between the Reich Survey Office and the Main Survey Offices. The first and second-order networks were handled by the Reich Office, the lower-order surveys by the Main Offices. While this work was in progress, Austria and the Sudetenland were incorporated into the Reich and Czechoslovakia was occupied. New problems arose whose solutions were far from easy. The survey systems of both countries were still based essentially on those of the former Austro - Hungarian monarchy. The successor states had realized that these data, although good enough in their day, did not satisfy modern requirements. In both countries an effort was made to secure a new survey. Czechoslovakia had started a radically new survey because the errors of the former one could not be corrected even by the most intricate adjustments. Again it was necessary to combine the geodetic data of both countries with those of the German Reich and to effect a general co-ordination. In the midst of all these efforts another enormous field of work was opened up by the forced construction of the West Wall. It was necessary to enlarge the control-point network along the western border in order to provide control points for the surveying work in connection with the construction of the West Wall as well as to prepare for the later employment of artillery within this fortified belt. For this purpose it also proved necessary to survey prominent points on the other side of the border for firing data and to include them in the German control-point network. It was intended to provide one control point per square kilometer in areas of vital military and economic importance.

Naturally, the survey system was not intended as an end in itself, but as a skeleton for an up-to-date map system. All survey results, including those of the cadaster, were to be included in a newly created map series, the "Basic Map of the German Reich," (Grundkarte des deutschen Reiches) with a scale of 1 : 5,000. The Main Survey Offices were to prepare this map for their respective areas and keep it up to date. It was to serve both military and civilian interests, the latter with respect to business and transportation. It was also intended to hand over to the Main Survey Offices the management of the 1 : 25,000 series (topographic maps) within their respective areas. Military and civilian circles had not yet decided whether this map should be kept up or abolished. The military had begun to introduce the 1 : 50,000 series for the German Reich. The idea was to provide troops with a useful map for the lower and intermediate command levels as well as for the firing of artillery and heavy weapons. Moreover, it was necessary to adapt the German map series to those of the neighboring countries. This 1 : 50,000 series was to perform the functions of the 1 : 25,000 series as well as of parts of the 1 : 100,000 series. At the beginning of the War only a few sheets of the latter scale had been completed -- for Silesia and the border province of Posen in Western Prussia. It was then decided to abandon the 1 : 100,000 series, since it was impossible to keep so many maps up to date at the same time. Many of the military, especially those of the older generation, favored the traditional "general staff map," which was quite easy to handle; however, for the purpose of mechanized movements the area covered by these old maps was too small and as regards firing data they were absolutely inadequate. On the other hand, the 1 : 300,000 series did not contain enough details on terrain features for the purposes of the lower and intermediate command levels. Its scale was also too unwieldy for computation purposes. The 1 : 200,000 series avoided these disadvantages. Besides, it corresponded to the scales used in most of the neighboring countries. The areas which had been newly incorporated into the Reich, that is, Austria, the Sudetenland,

and the Protectorate (Bohemia and Moravia), were also provided with maps of this scale. It was decided, therefore, to revive the old German 1 : 200,000 series, a splendid piece of work, although discontinued after World War I for reasons of economy, to bring it up to date and to modernize its design. Extensive tests were carried out to determine whether elevation should be represented by contour lines or hachures. A general reintroduction of this map, however, was prevented by the war. It was also intended to prepare a 1 : 500,000 series for the purpose of the top-level command. However, this project never got beyond the experimental stage in generalization, drafting specifications, and elevation representation.

In addition to this planning of new series, progress on the old maps had to be continued, at least until they could be replaced by the new ones. So many omissions had to be added, so many changes brought about by the enormous economic development and the construction of the Autobahn system had to be considered that the personnel available was by no means sufficient. Indeed, in the case of certain series engraved largely on copperplate, the difficulties were nearly insurmountable owing to the lack of trained copperplate engravers. This profession, as is well known, was disappearing because of the precipitous development of photography and electroplating. Young men had to be trained again, which took a long time since this profession required the same degree of manual skill that is expected of an artist.

After the annexation of Austria and the Sudetenland and the occupation of Czechoslovakia, German cartographers were confronted by a vast amount of new work. It was intended at first to keep up the old maps in these areas, mainly those with scales of 1 : 75,000 and 1 : 200,000. Besides, the Czechs had just begun a 1 : 25,000 map and were rearranging their entire cartographic system.

The modern German 1 : 5,000, 1 : 50,000, and 1 : 200,000 maps were to be gradually extended to these areas also.

II. Efforts to Establish a Wehrmacht Mapping and Survey Service

As mentioned before, the effort to combine the entire German survey and mapping services under the Wehrmacht was not successful. Even within the Wehrmacht itself, it was not possible to achieve any centralization of the three services (Army, Navy and Luftwaffe) in this respect. Each service insisted narrowly on preserving its own independence. The peculiarities of the different services were emphasized in order to prevent their combination in an "Armed Forces Cartographic Office," as proposed by Branch Nine of the Army General Staff in 1937. It was argued that a hydrographic map had nothing in common with a terrain map and that a pilot chart for aerial navigation served other purposes than did a General Staff map. Men were unwilling to realize that the exploitation of just such peculiarities as these would have rendered great advantages to the Wehrmacht as a whole and would have avoided unnecessary duplication.

In this way the Luftwaffe and Army developed independently their 1 : 500,000 map series of Germany. A joint map could easily have served the interests of both services by the addition or omission of one or several printing plates. At another time the Army wanted to develop a map series for radio direction finding and could very well have utilized the Navy's experience in the field of Mercator projection charts. Since there was no actual joint command of the Wehrmacht before the war, the necessary unification of the mapping and survey service within the Wehrmacht was left undone. It was really a tragicomedy when, contrary to the advice of the Chief of Mapping and Survey (Chef des Kriegskarten- und Vermessungswesen), who was responsible for preparing the Wehrmacht maps, Adolf Hitler issued an order for the establishment of Armed Forces Cartographic Office in mid-February 1945, at the moment when American forces were striking at Central Germany and the Russian Army had crossed the Oder at several places.

Since real centralization of mapping and surveying within the Wehrmacht remained unaccomplished, joint tasks had to be solved by co-operation between the top-level agencies responsible for mapping and survey in the three services. On questions at the Wehrmacht level Branch Nine of the Army General Staff was invested with Wehrmacht authority. Co-operation was especially close with Branch Six of the Luftwaffe General Staff. The latter handled the entire field of aerial photography. Special mention is due to Hansa Aerial Photos, an agency under the German Air Ministry. Aerial photographs, especially strip mosaics obtained by photographic survey flights with especially trained crews, were indispensable for any modern cartographic system which proposed to keep pace with the changes in the earth's surface brought about by modern economic life. Aerial photographs were the chief material used for correcting maps. They were handed over to the Reich Survey Office, which interpreted them by photogrammetry and used them for correcting maps.

III. The Army Map Service (Heeresplankammer)

Since the attempt to get mapping and survey into the province of the Wehrmacht had not been successful and, in view of the fact that the construction of the West Wall and the fortifications along the eastern border had created a lot of military tasks of a secret nature within the province of mapping and survey, Branch Nine of the Army General Staff organized, by means of partition, a new subordinate agency called the "Army Map Service." This-designation, however, does not describe too well the scope of its activity. Apart from the cartographic and printing establishments which are associated with such a designation, this office was also provided with a survey section and a photogrammetrical section. It was able to carry out extensive, independent surveys and constituted a military survey office in miniature. It was the task of the Army Map Service to carry out surveys closely connected with defense, and to design and produce classified maps and charts. For this latter purpose the necessary data were furnished by Branch Ten (Fortifications) and Branch Three (Eastern Intelligence Branch) of the Army General Staff.

IV. Activities of Branch Nine

While the tasks mentioned above were carried out in co-operation with the civilian survey agencies, Branch Nine also had to handle a number of purely military problems.

First of all, there should be mentioned Military Geography (Mil-Geo), an ancient province of science which, however, now had special literature and maps. Laborious and lengthy descriptions and information concerning German and foreign areas of military interest, including traffic nets and signal communication, buildings, power stations, and factories, were first collected in a card index and then evaluated and published in the form of Mil-Geo studies with maps. In the same manner road condition maps of Germany were produced and it was planned to extend these maps to foreign countries which might be included in the mobilization maps. The entire road net, with gradients shown in percentages, was clearly depicted on these maps; width of roads, bottlenecks, road surface with load capacity, over-and under-passes and the distances between localities were specially indicated, often with the inclusion of through-way plans. Sometimes these maps were published as special booklets.

Opinions in Wehrmacht circles concerning these studies in military geography were contradictory. While some thought them too bulky and too extensive, others found fault with them for not containing enough details. Too much self-restraint and a failure to assign enough first class experts prevented the Mil-Geo studies from attaining a significance corresponding to their importance.

Branch Nine superintended instruction in mapping and survey at the officer candidate schools, and the Kriegsakademie.* Owing to the shortage of instructors who possessed both teaching ability and the zeal of youth, the instruction did not succeed in awakening in the younger generation any special interest in this important field of military science.

According to the mobilization instructions issued by the Chief of the Army General Staff, Branch Nine also worked on the mobilization tasks that came within its scope. These comprised

1. The storage of mobilization maps for the troops,

2. Preparations for the organization and training of topographic troops and mapping units, and

3. Mobilization plans for Branch Nine and its subordinate agencies, including those agencies which were to come under Branch Nine upon mobilization.

According to the strategic plan of the Armed Forces High Command, the Chief of the Army General Staff issued orders for the storage of mobilization maps for the troops. These orders were for the most part forwarded to Branch Nine either by the Deputy Chief of Staff (Operations) or during conferences with the Operations Branch. In keeping with the enlargement of the Wehrmacht and because, until a few years before the war the German planning envisaged a delaying strategy on German soil, the amount of maps stored for mobilization purposes grew more and more voluminous. The final preparations for mobilization, however, provided for a defense at the German borders. In the East, South, and West a belt of 150 to 200 kilometers on foreign soil was envisaged as an outpost area for this defense and was covered by maps from the respective countries. In the West this belt reached the Seine. No medium scale maps were prepared for the area beyond this river. This would have meant great inconvenience in the campaign of 1940 if the fighting, for the most part, had not stopped short of the Seine. The master copies of all maps needed were taken from the files of Branch Nine, which contained original copies of nearly all the foreign maps in existence -- with the exception of those covering Russia. (Because of excellent Russian security measures, only a few random sheets from the Russians' latest map series -- which were very good -- had been obtained.) The series in question were then submitted to the Operations Branch or the Deputy Chief of Staff together with professional suggestions. In a joint conference it was decided which series were to be reproduced for the headquarters and field units and what quantities were to be stocked.

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*Tr: Roughly equivalent to the U.S. Command and General Staff School.

The reproduction of these maps was generally carried out on a very large scale. The Reich Survey Office, the Army Map Service, and private industry all had their share. Highly efficient reproducing firms made it possible to reproduce even the most difficult colored maps in a very short time with such a degree of accuracy that they could be easily mistaken for the originals. Redrawing and relettering were generally dispensed with. The necessary references and explanations were printed in the margin.

German and foreign mobilization maps were separated into lettered "sets" according to scale as follows:

A - 1 : 300,000 and 1 : 200,000
B - 1 : 100,000 1 : 80,000 and 1 : 75,000
C - 1 : 25,000, transparent reproduction materials, and trig lists with sketches.

In addition, higher headquarters and certain units were provided with special maps, for example, the general 1 : 1,000,000 series and railway maps.

Since a set consisted of an enormous number of single sheets and was not only bulky but also very heavy, the sets were further subdivided. Set A, covering all of Germany, was subdivided into subsets "West" and "East."

Set B, which contained even more sheets, was subdivided into (1) subset "East," parts I, II, III, IV: "East I" began on the Baltic;

East IV covered Austria, Poland and Hungary; (2) subset "West," (parts I, II, III) which began on the North Sea and ended on the Swiss border; and (3) subset "South," which was not subdivided owing to the limited area covered. The last contained maps of the German-Austrian Alps and South Germany. In order to save additional weight the sheets covering Central Germany on both banks of the Elbe were gradually discarded.

Because of the enormous number of sheets involved the 1 : 25,000 series was not put out as a set. The printing sections of artillery observation battalions and the survey battalions were supplied, according to their equipment, with thin transparent reproduction materials ("Ultraphan")* on which the drafting specifications were imprinted. Whenever the need arose these units were able to make copies of the maps for the troops with their ozalid machines and printing presses. It was the same with respect to survey data, which consisted of trig lists and descriptions of points.

In peacetime, units down to company level were supplied with the entire stock of mobilization maps. In agreement with the inspectorates of the different arms and services and the other General Staff branches, Branch Nine fixed the authorized basic map allowance for each unit of the Army in a special appendix to the mobilization plan. When, during the

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*Tr: a substitute for "Astralon," see p. 41

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*Tr: a substitute for "Astralon," see p. 41

In order to be able to meet sudden demands from the field units and to enlarge certain map storage depots on short notice, the Main Map Storage Depot was established in Berlin. It contained an adequate supply of each map series, survey data, Mil-Geo studies, and transparent reproduction materials that were kept in the mobilization map sets of the field units and in the map storage depots.

All map sheets kept in the map storage depots were bundled and each bundle contained the map required by one division. In this way distribution and supply were greatly simplified and accelerated.

It was necessary to make the field units independent for purposes of map supply and to enable them to reproduce sketches and printed maps themselves, especially so that they could reproduce captured maps and make them quickly available for their operations. For this purpose headquarters from division upwards were provided with map units.

To be sure, a division map unit, owing to its limited personnel and its imperfect technical equipment, was not very efficient. It could only prepare sketches and make notations on maps and reproduce these in limited numbers on an Opalograph.*

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*Tr: Similar to hectograph, except that a bluish-colored stone replaces the gelatine slab.

It was quite a different matter with a corps map unit, which had sufficient numbers of professional experts, cartographers, and printers and was provided with a very efficient small rotary press with the necessary reproducing equipment. This press, called the "Rotaprint," was able to reproduce more than 2,000 maps the size of a 1 : 100,000 sheet* in one press run. This unit could supply maps for all troops attached to a corps.

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*Tr: The Germans used different sheet sizes for the various scales.

The organization of an army map unit was similar to that of a corps unit. It was provided with a larger mechanical rotary press from the firm of Kikebusch and could reproduce maps the size of 1 : 100,000 composite sheets (usually four sheets combined). This unit could furnish maps to all the field units attached to the army.

Apart from these map units the survey battalions were able to produce maps with their own map companies, which had an adequate number of cartographers, draftsmen, reproduction technicians, and printing personnel. Their mechanical equipment was similar to that of the army map unit. They were also provided with qualified personnel and equipment for evaluating and measuring aerial photographs.

Besides the map company the survey battalion also had a survey company. Its mission was to establish a uniform control-point network on a broad front for artillery purposes, which was supplemented by the work of the survey companies of the observation battalions. Furthermore, survey battalions were able to carry out new surveys on a limited scale and to correct maps. For these purposes close co-operation was arranged with the army reconnaissance squadrons from the Luftwaffe. For special missions, such as assignment to railway artillery and higher-echelon fortress construction staffs, it was intended to organize special survey platoons. These were to carry out surveys on a limited scale and establish contacts with a control-point network.

The establishment of map storage depots and the proposed organization of map units and survey battalions was to guarantee that sufficient maps would be available when needed. Since very considerable quantities were involved, the problem of how to get them to the right place at the right time remained to be solved. It was not possible to organize special transport agencies, because the maps had to be supplied only occasionally. The use of special vehicles,therefore, was not justified. For distribution, Branch Nine wanted to use the supply facilities of Branch Six (Supply), and recommended that a paragraph on map supply be inserted in the supply manual. Permission to include this was refused. Therefore, Branch Nine inserted an order in the mobilization instructions that intermediate and higher staffs be made responsible for their own map procurement and distribution.

In peacetime, officials from the higher-level survey services with university training were included in the operations staffs with corps and higher headquarters. These "survey operations officers" (Ia/Mess) were to handle survey and mapping within their respective areas under instructions from Branch Nine. These officials were also appointed by Branch Nine.

In case of war, these survey operations officers were to be placed in charge of the mapping units which would be organized by their respective commands. At the outbreak of war, therefore, the survey operations officers at intermediate and higher headquarters would cease to function. The commanders of the mapping units with these headquarters were to become responsible for supplying maps as well as survey and Mil-Geo data. Since the mapping and survey units were organized only upon mobilization and since their number was limited, being dependent on the number of corps and armies called for by the mobilization plans, a special inspectorate for these troops was considered unnecessary. In peacetime, therefore, Branch Nine of the Army General Staff also performed the duties of an inspectorate of survey troops. Equipment was tested and introduced in co-operation with the Army Ordnance Office. Tables of organization and equipment were established in co-operation with the General Army Office (Army, Rear). Branch Nine also handled the training of mapping and survey personnel. This training was given mostly by officers from the Branch in the form of courses and surveying exercises lasting several weeks. In order to establish a permanent agency for purposes of training and testing, an instruction staff for survey troops (Instruction Staff "C") was organized in 1938 as an appendage of the Field Artillery School at Jueterbog. Under the supervision of Branch Nine, courses were given to reservists who had been assigned to mapping and survey units, new equipment was tested, and service manuals published for survey and mapping troops. Close co-operation with the artillery was guaranteed by attaching the instruction staff to the Field Artillery School and by designating an artilleryman as director of the instruction staff. Branch Nine considered transferring the tasks of an inspectorate of mapping and survey troops to the inspectorate of artillery.

It was also necessary to take steps for the preparation and printing of maps in Germany in the event of mobilization. It was vital to secure the necessary professional experts not only for the Reich Survey Office and the Main Survey Offices, but also to secure the services of the great number of private cartographic institutes and printing firms necessary for the preparation and reproduction of maps. These firms were declared vital to the military effort and each was placed under the jurisdiction of Branch Nine of the Army General Staff, Branch Six of the Luftwaffe General Staff, or the Navigation Branch of the Navy High Command.

Moreover, it was necessary to make sure that these firms were provided with the necessary materials and fuel. The supply of paper, inks, map sheets, chemicals, and fuel had to be guaranteed. All these closely interconnected problems called for the preparation of a detailed mobilization schedule which was handled in close co-operation with the Military Economics Staff.

Branch Nine also prepared its own mobilization schedule within the framework of the Army General Staff. The Army General Staff was divided into two echelons, the first of which comprised all those agencies directly connected with operations and not confined to any fixed, place, while the second echelon consisted of those elements that were not absolutely necessary for the conduct of operations and had to remain in close contact with the agencies in the zone of interior. Most of the Branch personnel was assigned to the second echelon in order to handle map production at home and to supply maps to the fronts. It was to have the title "Mapping and Survey Branch (Rear)" (Abteilung fuer Kriegskarten- und Vermessungswesen). Only one liaison officer with a small staff was to constitute the first echelon, which was to receive instructions from the Chief of the General Staff and requests from the Operations Branch. The first echelon was to represent the interests of the mapping and survey organization and the survey units in accordance with the instructions of the "Chief of Mapping and Survey," the title of the Chief of Branch Nine.

Chapter 2

Military Mapping and Survey During World War II

I. Organization

1. Staff Organization

The lack of survey operations officers with the higher field commands made itself disagreeably felt during the Polish campaign. The Wehrmacht had a similar experience during the campaign in the West. The first echelon of the Army General Staff was located at a considerable distance from the second echelon, which included the Chief of Mapping and Survey. There was no representative of the top-level survey office included in the first echelon. The establishment of a new agency with the first echelon for the handling of mapping and survey was in general demand. This need was filled by establishing the post of Commander of Mapping and Survey Units in the Field (Kommandeur der Karten- und Vermessungstruppen) prior to the start of the Russian campaign. The holder of this position emerged as the permanent representative of the Chief of Mapping and Survey with the first echelon. This duplicate organization, however, caused unpleasant disagreements between the Chief of Mapping and Survey and the Commander of Mapping and Survey Units during the war. It would have been better if the Chief of Mapping and Survey, accompanied by a few officers, had joined the first echelon and left the rest of the Branch, with his representative as its head, with the second echelon. In order to avoid these rivalries, which were often aggravated by arbitrary acts on the part of survey and mapping agencies from the other services (Luftwaffe, Navy, and the Waffen SS)*, the Operations Branch of the Army General Staff and, even in 1944, the Armed Forces Operations Staff requested that an agency be organized under an "Armed Forces Chief of Mapping" with a general officer as its head, and that most of the survey agencies from the top-level organizations of the various branches of the Wehrmacht be incorporated into this Wehrmacht Office. The Chief of Mapping and Survey, having foreseen long before the impending collapse of the German Army, declared himself against such an organization. Therefore, the "Fuehrer Directive" for the establishment of an "Armed Forces Chief of Mapping" was delayed until Easter 1945, just as the American forces were driving a deep wedge into Central Germany that separated the Army General Staff, located in the Alps, from the Navy High Command in Holstein. The location of the Luftwaffe Staff was unknown. The impossibility, therefore, of carrying out this order had to be reported. Shortly afterwards, on 28 April 1945, the position of military head of mapping and surveying was abolished.

For the handling of mapping and survey matters there remained only the Commander of Mapping and Survey Units with what was left of the Army General Staff.

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*Tr: The combat arm of the SS (Schutzstaffel)

2. Survey Operations Officers (Ia/Mess)

At the beginning of the Polish campaign in the fall of 1939, the survey operations officers of the various Wehrkreise were to be appointed chiefs of corps mapping units of the corps which would be organized by their respective Wehrkreise in the event of mobilization.

Only Army Groups 1 (Berlin) and 2 (Frankfurt), which were provided with survey operations officers in peacetime, retained these officers in this position after the beginning of the war when Army Group 1 Headquarters requested this from the Armed Forces High Command. Army headquarters, most of which were organized upon mobilization from the other army group headquarters (which were not provided with survey operations officers in peacetime), had none of these officers at all at the beginning of the war. In preparing for mobilization, it was thought that the commanders of the survey battalions or army map units would be able to discharge the duties of a survey operations officer at the same time. However, even during the concentration of troops in their positions prior to the start of the Polish campaign, the lack of army survey operations officers proved to be a great disadvantage. Since the commanders of survey battalions and map units were sometimes civilian surveyors, they had no idea of the variegated tasks in front of them.

At the beginning of the Polish campaign the chief of staff of Fourth Army requested of Army Group 1 Headquarters that a trained survey operations officer be assigned to his headquarters. Army Group 1 Headquarters submitted this request to the Organization Branch of the Army High Command, to the Army Personnel Office, and to Branch Nine.

After the Polish campaign, when the armies moved into their positions on the West Wall, these newly authorized T/O positions for survey operations officers were filled with army survey officials, who then were given officer status in the engineers. By virtue of their peacetime experience, these men were already familiar with the organization and paper work in higher headquarters as well as with surveying, cartography, and reproduction. Only gradually, as more army headquarters were organized during the war and as more engineer officers were assigned to troop units, were these authorized army survey operations officer positions filled by well-qualified peacetime persons who had had civilian peacetime experience in that field.

During the subsequent course of the war, authorized survey operations officer positions were also established with corps and division headquarters. Very often, however, in order to save personnel, these positions were filled by commanders of map units.

This amalgamation of mapping and survey at army headquarters by the authorization of survey operations officers proved a great success and was retained up to the end of the war. However, some division survey operations officers and division map units had to be dissolved in 1944 on account of the critical shortage of personnel and materiel at that time.

3. Map and Survey Units

Survey and map units, for mobilization purposes, had been organized only on paper on the basis of a few makeshift exercises in peacetime and the recollection of position warfare in World War I.

Their mobility was at first quite limited and their reproduction capacity was inadequate for modern warfare. There were no suitable vehicles for supplying maps to the field forces, which advanced with surprising speed. Survey missions in specific areas for the enlargement of control-point nets, which was originally considered the principal task in surveying, lost all their importance in mobile warfare. After the Campaign in the West, it became necessary to reorganize the survey battalions as "survey and mapping battalions" -- with emphasis on mapping activity. The special survey and reproduction platoons with the higher-echelon construction staffs were abolished and their personnel and equipment utilized for the reorganization. Uniform printing presses such as "Kikebusch" (70cm x 90cm) and "Rotaprint" (30cm x 40 cm) in standard trailers were manufactured in large numbers and issued to the battalions by the Army Ordnance Office. The results achieved by the units were of great help in the Russian campaign, because the German espionage service had failed to obtain any up-to-date Russian map series, and serviceable Russian maps had to be redesigned and reprinted during the campaign by the survey and map units on the basis of captured maps.

The lack of trucks for use by map units made it very difficult for the home agencies and factories to supply large quantities of maps during the Polish and French campaigns. Accordingly, Army Group 1 requested the organization of motorized army map depots. The request was granted by the Organization Branch of the Army High Command and the depots were organized prior to the start of the Russian campaign in the form of map delivery units with five trucks each. They proved indispensable in the wide open spaces of the East.

After being reorganized and provided with standard vehicles and equipment, the survey and mapping battalions, the army, corps, and division map units, and the motorized army map depots proved very successful and retained their form of organization to the end of the war. During the final years of the war, some special companies, such as survey plotting companies, special survey companies, and map companies, were reorganized for use in conjunction with the "V" weapons and for other special missions. The activity of such units was quite limited in scope. In 1943 the motorized map units with army group headquarters were reorganized into "light map-printing battalions." At the request of the Commander in Chief, West, a special regimental survey staff was organized in 1943 for the purpose of linking together all the survey and mapping units in the West. It was to co-ordinate and standardize all the survey work on the coast.

4. Permanent Agencies of the Mapping and Survey Service

At the beginning of the war, there existed only a few permanent agencies: some army map storage depots, the Vienna Surveying Office, and the Army Map Office in Berlin, all of which had very limited capacities. Apart from the work of putting fortifications on classified maps, the latter served as a record-keeping office for mapping and survey and as an assignment agency and pay office for the extensive map reproduction handled by civilian offices, especially the Reich Survey Office, and private firms. The Wehrmacht thought it a great misfortune not to have been able to establish in peacetime a large and efficient institute of military cartography after the model of other civilized nations -- something which might have been accomplished by reincorporating the Reich Survey Office into the newly expanded Wehrmacht. As it was, the capacity and efficiency of the survey and mapping battalions and of the army map units soon proved to be much higher than that of the Army Map Service. This fact caused continuous trouble between the front and Berlin. A certain compensation was effected during the course of the war when the military cartographic institutes of several defeated enemy countries were commandeered and placed under the Chief of Mapping and Survey, thus enabling him to assign projects directly without having to go through the time-consuming channels of the civilian ministries.

The organization of Mapping and Survey Offices was proposed by Army Group 1 upon its transfer from France to the East (Posen) in the autumn of 1940 and after it had taken over the command of every military agency within the Government General. In spite of the fierce fighting in the Polish capital, the buildings of the former Polish Institute of Military Geography were only slightly damaged. They still contained some of the heavy printing presses, most of the instruments and other light equipment having been evacuated to the East by the Poles prior to the siege of Warsaw. After the fall of Warsaw the 501st Motorized Survey Battalion took over the administration of these buildings and the surveying projects on new troop training grounds.

In order to utilize the remaining reproduction capacity of the Polish Institute, Army Group 1 proposed to the Organization Branch of the Army High Command the establishment there of a mapping and survey office in which Polish professional experts would work under German supervision. With the permission of the Army High Command Mapping and Survey Office No. 1 (Warsaw) was accordingly established. After the capture of Minsk during the Russian campaign a second mapping and survey office was created by converting a Soviet map factory after the Warsaw model. Meanwhile, Army Groups North and South had also penetrated deep into Russia and captured towns where institutes of military geography and map reproduction plants were discovered. These were also reorganized as mapping and survey offices after the Warsaw model, sometimes by combining several small institutes.

Later on, as mobile warfare turned into position warfare and it became apparent that the war would last a long time, the possibility of an Anglo-American invasion had to be considered. The West was again important in a military sense. This was apparent from the increasing demands made upon the mapping and survey services. Military mapping and survey offices patterned after the Warsaw model were also established in the West at Paris, Brussels, and Utrecht. All in all, ten mapping and survey offices existed in 1943, some of which, however, were later abolished, combined, or transferred to the rear during the major withdrawals. By the end of the war the Warsaw Mapping and Survey Office, for instance, had been moved via Posen to Wuerzburg; the Brussels office to Alsfeld; the Rostov office via Stalino, Winniza, and Cracow to Goerlitz; the Riga office to Brandenburg; and the Belgrade office had been combined with the Vienna Surveying Station.

It was not possible for a central agency in Berlin to care for the personnel and the equipment of these widely separated offices and to control their assignments; it would have meant too much delay had the survey operations officers from the army group been obliged to submit their requirements to offices within their own areas by way of Berlin. It was necessary to link the offices together by new superior agencies in accordance with the organization of the field forces. For this purpose the Army High Command designated some of the older specialist officers as "Senior Officers of Mapping and Survey," to be directly under the Chief of Mapping and Survey but instructed to co-operate directly with the army group headquarters in their area. In 1943 three such posts existed: Senior Officer "East" for the East and North East, Senior Officer "Southeast" for Prague and the Southeast, and Senior Officer "West" for the West, who was also Commander of Special Regimental Survey Staff No. 1.

When these offices were moved to German territory, some of them were combined or abolished. During 1944 and the early part of 1945 all became superfluous and were abolished.

In November 1943, in order to standardize the permanent military mapping and survey establishments, the "Army Map Service" (Heeresplankammer) was reorganized as the "Central Cartographic Office" (Kriegskartenhauptamt), a designation that characterized it as the main center for all the military mapping and survey offices. All material which was no longer needed for the current work in the various offices was collected there. It continued to function in central Germany up to the end of the war.

II. Geodetic Operations

At the beginning of the war, trig lists existed only for the areas along the border. During the Polish campaign only local surveys around the fortresses of Warsaw and Modlin appeared necessary and these proved superfluous after the capture and reproduction of original Polish 1 : 25,000 maps of these fortified areas. During the rapid advance through the Netherlands, Belgium, and France, surveying was of no special importance.

During the campaign in North Africa, survey units had to secure data for the completion and correction of the very defective maps of these areas by designating new control points. They also had to provide the troops in the desert with a means of orientation utilizing astronomical calculations.

Prior to the Russian campaign the control-point net along the border between the Russian and German spheres of interest was enlarged for the benefit of defense positions in anticipation of a possible Russian attack.

During the mobile phases of the Russian campaign, the part played by the survey service was insignificant. It was not until the second summer (1942) that extensive survey work was carried out along the main line of resistance to a depth of from ten to forty kilometers within the area of Army Groups North and Center; Army Group South advanced quickly to the Caucasus, and there was neither time nor the need for any special survey work. In the meantime the Russian catalog of first-order trig points (Gauss-Krueger System) was captured, reprinted, and distributed by the Chief of Mapping and Survey. These first-order trig points represented the points of departure for extensive triangulation projects. After several Russian penetrations of the Germans' main defense line and the latter's withdrawal from several front sectors, surveys of this kind had to be repeated in numerous areas, including that of Army Group South and, in 1944, of the German-Polish border. In order to guarantee a smooth transition from the Russian to the German data an overlapping zone was created at places where the German maps of Poland and Romania and the Russian and Baltic maps overlapped each other. At the same time complete unification of German and Polish geodetic data to a point about nineteen degrees east of Greenwich was carried out, and the maps were changed to the German army grid. Romanian map grids and co-ordinates were brought into conformity by extensive conversion. The survey data of the countries of southeastern Europe were revised and held ready for military use during the occupation.

Unification and change to the German army grid (Gauss - Krueger system in belts of six degrees) was accomplished in co-operation with the institutes of military geography in Hungary, Romania, Bulgaria, and Croatia. Between 14 and 16 October 1943, a large conference, attended by the experts of these countries and presided over by the German Chief of Mapping and Survey, cleared up the technical details of the basic work connected with the introduction of the German Army grid into Yugoslavia, Greece, Bulgaria, and Albania.

In Italy the co-ordinates, including the secret artillery co-ordinates, were converted and integrated into the existing German Army grid system. During the last two years of the war, survey battalions had a lot of work in this theater enlarging networks along the changing main lines of resistance.

Beginning in 1942, survey and mapping data had to be kept ready in the West for the defense of the Channel and Atlantic coast. Continuous improvements and extensions towards the interior were carried on until the invasion.

Since the French triangulation system, except for the Paris parallel, which in 1938 had been advanced to the bay of St. Michel, covered only the eastern part of the country adjacent to Germany, it was necessary to make a principal triangulation for the Atlantic coast in order to survey gun battery positions and to establish geodetic data for the 1 : 25,000 map of the Atlantic fortifications, which was produced from aerial photographs by the "Multiplex" method.

The 563d Motorized Survey Company was organized for this purpose, and it carried the triangulation as far as the Atlantic coast, utilizing where possible, the services of the "Institut Géographique National" (the former "Service Géographique de l'Armée"). This survey company completed the St. Michel parallel as far as Brest and the coastal belt of the Rochefort parallel, while the French handled the Rochefort and the Toulouse parallels. Army surveyors located the six-kilometer base line near Brest and the ten-kilometer base line near La Rochelle, while the French located the Dax line. In 1943 the same battery carried out coastal triangulation between Marseille and Perpignan.

After 1943 the mapping and survey systems of northeastern France, Belgium, and the Netherlands were standardized by abolishing the World War I grid system for northern France and extending the new Lambert grid to include all of northeastern France, Belgium, and the Netherlands. Southern England as far north as fifty-two degrees latitude was also included in this system. The entire Channel coast, including Belgium, a part of the Netherlands, and southern England were now covered by a uniform system of French map grids. This difficult geodetic project was carried out by the 762d Survey Plotting Company in Paris. In 1943, a special survey company was organized for the firing positions and the fire direction centers of the "V" weapons.

The mapping and survey data necessary for the defense of the Mediterranean coast was also kept in readiness. Since surveying on

Spanish territory was not permitted, overlapping grids for the defense of the Pyrenean spurs in the vicinity of Hendaye and Perpignan were computed after a difficult calculation of the change of spheroid.

In Norway and Denmark survey data and maps were obtained and corrected regularly.

At the beginning of the invasion the necessary survey work had been finished and all the co-ordinates were ready.

During the subsequent course of the war when the front lines were withdrawn in all theaters and eventually even onto German territory, orders were repeatedly issued for new defensive positions, something which called for extensive survey work. Generally, these surveys had to be discontinued shortly after being commenced, since the strategic and tactical developments made all planning pointless and forced the German command to take up new defense lines. These disastrous setbacks recurred every few weeks until the total breakdown of the German Wehrmacht in May 1945 brought an end to the war.

It was a special job of Group III (survey) of Branch Nine to publish a manual, first in a tentative and later a revised edition. This handbook was to present the most important geodetical data and short summaries on the map and survey situation of the area in question. Such manuals were published during the war for all the countries which became theaters of operations.

III. Cartographic Operations

At the beginning of the war there were very limited stocks of 1 : 100,000 (or 1 : 75,000 maps) and 1 : 300,000 maps of the areas along the German borders. Only for the West Wall were there a few hundred sheets of 1 : 25,000 maps, stored locally.

On 1 August 1939 there was only a single set of 1 : 100,000 maps of Poland and these extended only as far east as Warsaw. Only with great difficulty were a few bundles of 1 : 300,000 maps from Berlin and some sheets from the Polish Institute forwarded (in the former case by air) to the troops advancing in the direction of Brest Litovsk.

After this unpleasant experience in the Polish campaign, at the time the troops began to move into the assembly areas on the western border, the voluminous 1 : 80,000, 1 : 200,000, and 1 : 300,000 editions of the western border areas covering a depth of 200 - 400 kilometers (up to the Loire River) were printed, distributed to the troops, and stored in the map depots at Muenster, Wiesbaden (Bonn), and Stuttgart. The advance into France and the penetration of the Maginot Line were executed with such surprising speed that the German troops who had gotten beyond Paris found themselves with no maps for western France. At the last moment, by combining the efforts of the printing sections of the survey battalions, every army map unit, and some printing offices in Belgium, as well as by utilizing a collection captured in the archives of the Netherlands Institute, it was possible to photograph and reprint the 1 : 80,000 and 1 :320,000 maps of western and southwestern France in a suitable edition. Use was made of every surveying platoon in order to supply the division map units in time.

After the French campaign, maps of every existing scale of southern England were reprinted and stocked in the newly established map storage depots at Rennes, Brussels, and Lille for an eventual invasion of England. Later, the back sides of these maps served for the reprinting of French maps.

In the winter of 1940 - 41 the bulk of the German army was transferred to the East. Rumors of a Russian attack increased, and orders were issued for the preparation of a counterstroke. At that time printing began on large editions of maps of the entire eastern area, including the Balkans, with the following scales: 1 : 100,000 (1 : 75,000), 1 : 300,000 (1 : 200,000), and 1 : 1,000,000. These were reprints of old Russian, Romanian, and Yugoslav maps, some of which had to be enlarged to 1 : 100,000 and 1 : 300,000, having been prepared originally as 1 : 126,000 and 1 : 420,000, respectively (according to the verst* scale). The lettering was left in Russian, although in some cases with an overprinting in German. The maps were stored in the map storage depots at Koenigsberg (Insterburg), Warsaw, Radom, and Vienna and issued to the troops at the beginning of the Russian campaign.

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*Tr: Russian unit of length equal to 1. 067 kilometers.

Shortly thereafter, it was discovered that Russia had built up and kept strictly secret a very efficient mapping and survey service, which had produced a new 1 : 100,000 map series, as well as some 1 : 50,000 sheets, covering a large part of Soviet Russia. Retention of place names in the Russian (Cyrillic) alphabet, which the German soldier was unable to read, proved to be a grave mistake. The signposts put up by the German military police gave place names in Roman letters. With the co-operation of all the mapping units of the field forces, working continuously under the direction of the survey operations officers with army groups and armies, an entirely new 1 : 100,000 series of Russia was produced. Photographic copies of the captured Russian maps were made, Cyrillic letters having been replaced by Roman letters. Large editions were then printed and issued to the troops. Later, other special Russian maps were also reprinted. The maps were revised in Germany and stored in the depots. Subsequent German withdrawals made it repeatedly necessary to print new editions.

In some areas, for example, along the west side of the Black Sea, duplicate work was sometimes necessary. In order to provide headquarters with general maps of the whole area, all of the same scale, new 1 : 300,000 maps had to be produced -- in addition to those of the original scale (1 : 200,000). During the occupation, work also began on a standard 1 : 50,000 fire-control map covering the Balkans.

In Africa and Italy map requirements were satisfied by reprinting the existing original 1 : 200,000 and 1 : 500,000 maps. Classified

Italian maps, discovered during the temporary occupation of the Italian Institute of Military Geography, were also included in the German field sets. During 1943 - 44 the Florence Institute of Military Geography was incorporated completely into the German cartographic service under the supervision of a German liaison staff. Among other things this institute produced excellent relief and stereo maps by the anaglyph process for the German commands in the Italian theater of war.

After 1943 an entirely new 1 : 25,000 map series covering the original defensive area on the Channel and Atlantic coasts was produced with the aid of aerial photographs (Multiplex method) and the triangulation work of army survey units under the direction of the survey operations officers with the Commander in Chief, West. By the end of 1943 the 631st Motorized Survey and Mapping Battalion was producing one sheet in four colors per week; the Paris Mapping and Survey Office, with an attached map company, one sheet per day. The existing series were also consolidated during 1943 - 1944. The 1 : 50,000 section of the "Nouvelle Carte de France" was extended across Belgium into the southern part of the Netherlands; the Belgian 1 : 40,000 map was converted to 1 : 50,000 with four colors; the 1 : 80,000 map of France was modernized by enlergement to 1 : 50,000 with colors. By the beginning of the invasion, the new 1 : 25,000 map had been extended to include a strip one to two sheets deep along the Atlantic Wall, but the modernization of the 1 : 80,000 and 1 : 50,000 maps had not quite been completed.

Maps of Spain (1 : 200,000 and 1 : 50,000) were reprinted and stocked in map shortage depots in anticipation of an Allied landing there. The 1 : 50,000 series was later declared useless and destroyed. As a precautionary measure, the maps of Switzerland were reprinted and stocked in map storage depots. In Denmark and Norway cartographic problems were satisfied by merely reprinting the existing maps.

As of 31 December 1943, up to which time the German military mapping and survey service was still available for full employment, the total map output since the beginning of the war came to 1,232,610,480 sheets, having involved 5,156,433,750 runs (owing to the multiple colors). In 1943 alone, 16,490,784 sheets were printed in 80,133,250 runs. Of these 7,924,714 maps were printed in 41,784,960 runs by offices and firms in Germany on order of Branch Nine. The mapping and survey units of the field forces printed 8,586,070 sheets in 38,348,290 runs on order of the army groups.

Owing to the shortage of raw materials, cartographic work grew increasingly difficult from 1944 to the end of the war in May 1945. "Astrolon"* map sheets could no longer be obtained; the substitute "Ultraphan" did not have enough dimensional stability and required readjustments during reproduction. The loss of personnel drafted for the combat forces, difficulties with transport and the postal service, the destruction caused by air raids, and the critical situation on every front put tremendous obstacles in the way of map production and supply. Map output was dropping every month, while the demand remained the same owing to the continuous changes in the fronts. Survey and mapping units with armies that were temporarily surrounded often lost printing presses, materials, and other equipment. During the withdrawal in the West, for example, a serious loss resulted from the fact that the transfer of maps of eastern France into map storage depots east of the Rhine, proposed by the Commander in Chief, West, at the end of 1943, had not been carried out by the home agencies because of the shortage of personnel and space caused by the air raids. The map storage depots in Paris, Montauban, Brussels, and later Nancy were soon overrun. For the fighting in Alsace-Lorraine, therefore, new maps had to be printed.

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*Tr: A plastic consisting of 80 parts of vinyl chloride polymerized with 20 parts dimethyl maleic acid ester stabilized with sodium carbonate and pressed into sheets.

The same fate befell maps stored in the eastern depots; their transfer to eastern Germany had been delayed until it was no longer possible.

It has not been possible to make a final review of the work of military map production because of the German collapse. In 1944 - 45, however, approximately 16,000,000 sheets were printed by all the units and plants of the German map-producing service.

IV. Military Geographical Studies

At the beginning of the war, Mil-Geo data had been collected only for German territory, especially the Rhine, Elbe, and Oder River crossings. Included also was the German 1 : 300,000 road map.

It was not until after the Polish campaign that it was decided to publish emergency manuals on military geography, through-way plans, and the like for the cities of France, Belgium, the Netherlands, Great Britain, and later also of White Russia, the Baltic States, Finland, Scandinavia, Greece, Italy, and the African theater of war. These were gradually amended and completed, and -- after several years -- often published as finished manuals on military geography with appendices, including military maps, maps showing mountain passes, Mil-Geo charts, and descriptions of coastlines and rivers. In 1943, every country which had become a theater of war was covered by a Mil-Geo study. These were distributed to the respective agencies through the map storage depots or the survey operations officers, who handled the tasks of military geography for the field forces.

When large-scale withdrawals became an every day occurrence in 1944, work on new Mil-Geo studies was discontinued and the work then in progress was gradually curtailed. One Mil-Geo section after another was dissolved. At the end of the war there was nothing left but a small Mil-Geo storage site in the vicinity of Gotha.

German-English Glossary of Technical Terms

Durchfahrtsplan - through-way plan
Ellipsoiduebergang - change of spheroid
Folien - transparent reproduction materials
(Fest)punktnetz - control-point net
Grundlinie - base line
Generalstabskarte - general staff map
Gelaendeeinzelheiten - terrain features
Hoehendarstellung - elevation
Haupttriangulation - principal triangulation
Kartenwerk - map series
Kartensignatur - conventional sign
Kataster - cadaster
Kartenlager - map depot
Kartengitter - map grid
Koordinatenverzeichnisse - trig lists
Landesaufnahme - geodetic survey
Lichtpausgeraet - ozalid machine; photostat and phototype equipment
Messtischblatt - topographic (plane table) map
Netz I. (erster) Ordnung - first-order net
Schichtlinie - contour line
Schummerung - hachures
Strassenzustandskarte - road-condition map
T.P.I.O (trigonometrische Punkte erster Ordnung) - first-order trig points
Uebersichtskarte - general map (relatively small scale)
Vermessungsnetz - triangulation net
Vermessungsunterlagen - geodetic data
Zeichnung - design; drafting specifications
Ia/Mess - survey operations officer

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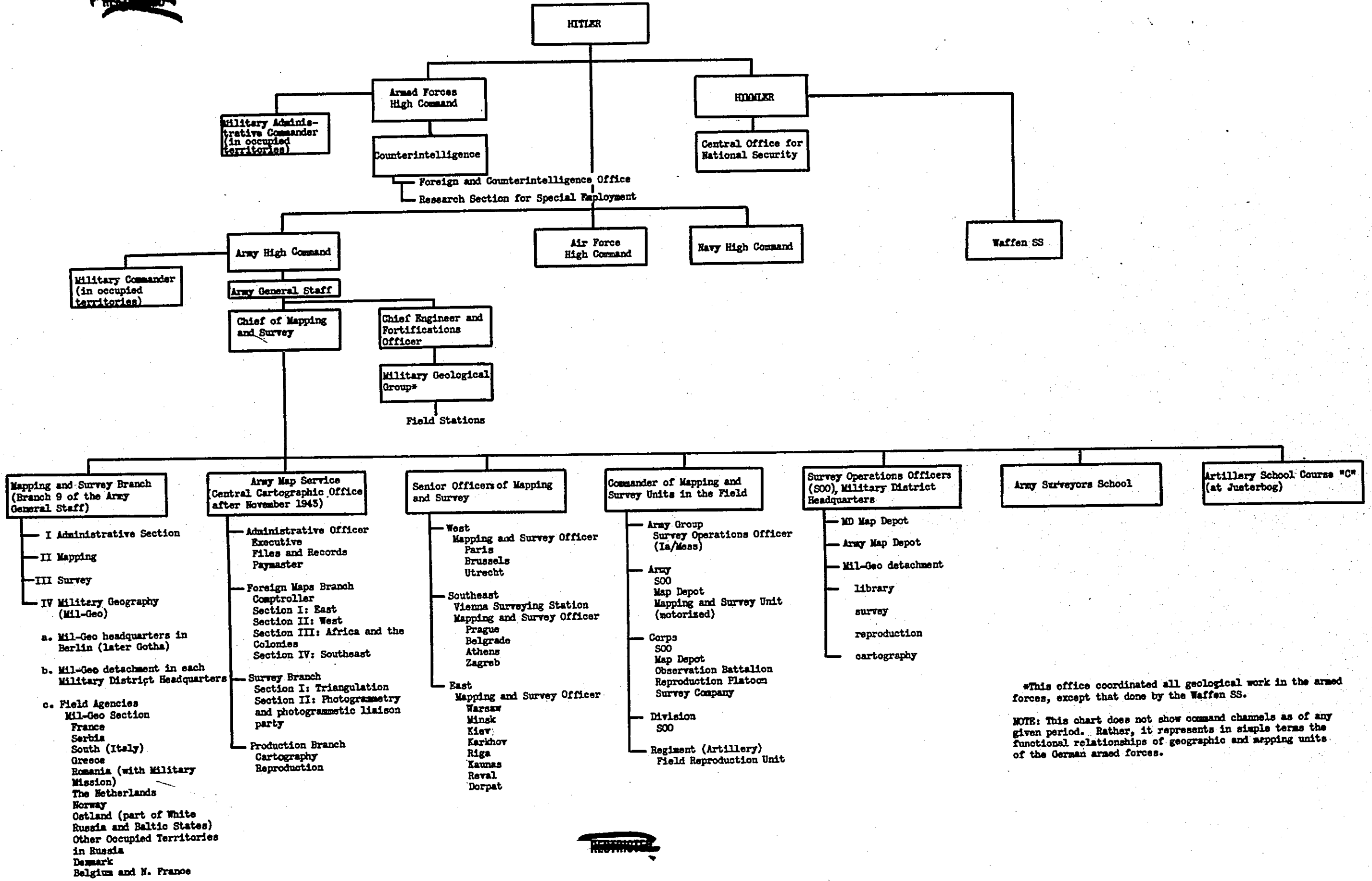
MAPPING AND SURVEY SERVICES IN THE GERMAN ARMED FORCES


HITLER
Armed Forces High Command
Military Administrative Commander (in occupied territories)
Counterintelligence
Foreign and Counterintelligence Office
Research Section for Special Employment
HIMMLER
Central Office for National Security
Waffen SS
Army High Command
Military Commander (in occupied territories)
Army General Staff
Chief of Mapping and Survey
Chief Engineer and Fortifications Officer
Military Geological Group*
Field Stations
Air Force High Command
Navy High Command
Mapping and Survey Branch (Branch 9 of the Army General Staff)
I Administrative Section
II Mapping
III Survey
IV Military Geography (Mil-Geo)
a. Mil-Geo headquarters in Berlin (later Gotha)
b. Mil-Geo detachment in each Military District Headquarters
c. Field Agencies
Mil-Geo Section
France
Serbia
South (Italy)
Greece
Romania (with Military Mission)
The Netherlands
Norway
Ostland (part of White Russia and Baltic States)
Other Occupied Territories in Russia
Denmark
Belgium and N. France
Army Map Service (Central Cartographic Office after November 1943)
Administrative Officer
Executive
Files and Records
Paymaster
Foreign Maps Branch
Comptroller
Section I: East
Section II: West
Section III: Africa and the Colonies
Section IV: Southeast
Survey Branch
Section I: Triangulation
Section II: Photogrammetry and photogrammetic liaison party
Production Branch
Cartography
Reproduction
Senior Officers of Mapping and Survey
West
Mapping and Survey Officer
Paris
Brussels
Utrecht
Southeast
Vienna Surveying Station
Mapping and Survey Officer
Prague
Belgrade
Athens
Zagreb
East
Mapping and Survey Officer
Warsaw
Minsk
Kiev
Karkhov
Riga
Kaunas
Reval
Dorpat
Commander of Mapping and Survey Units in the Field
Army Group
Survey Operations Officer (Ia/Mess)
Army
SOO
Map Depot
Mapping and Survey Unit (motorized)
Corps
SOO
Map Depot
Observation Battalion
Reproduction Platoon
Survey Company
Division
SOO
Regiment (Artillery)
Field Reproduction Unit
Survey Operations Officers (SOO), Military District Headquarters
MD Map Depot
Army Map Depot
Mil-Geo detachment
library
survey
reproduction
cartography
Army Surveyors School
Artillery School Course "C" (at Juterbog)

*This office coordinated all geological work in the armed forces, except that done by the Waffen SS.

NOTE: This chart does not show command channels as of any given period. Rather, it represents in simple terms the functional relationships of geographic and mapping units of the German armed forces.

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